N-Ch 120V Fast Switching MOSFETs

★ 100% EAS Guaranteed
★ Green Device Available
★ Super Low Gate Charge
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

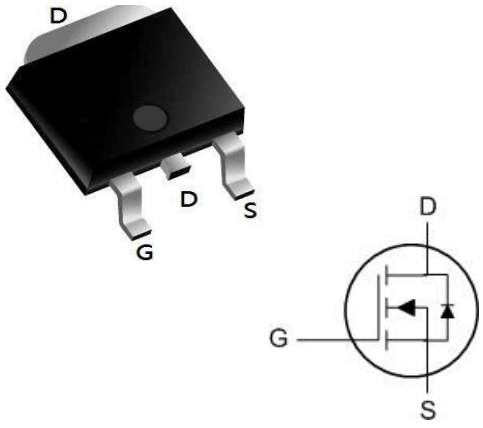
Green

BVDSS	RDSON	ID
120V	120 mΩ	15A

Description

The XR15N12 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provides excellent RDSON and gate charge for most of the synchronous buck converter applications .
The XR15N12 meets the RoHS and Green Product requirements, 100% EAS guaranteed with full function reliability approved.

TO252-3L Pin Configuration



Absolute Maximum Ratings (T_A=25 °C, unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current (T_A=25°C)	15	A
	Continuous Drain Current (T_A=100°C)	9.2	A
I_{DM}	Pulsed Drain Current(Note1)	58	A
EAS	Single Pulsed Avalanche Energy (Note2)	20	mJ
P_D	Power Dissipation(T_c=25°C)	66	W
T_J T_{STG}	Operation Junction and Storage Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	30	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.9	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characterisitics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	120	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance(note3)	V_{GS}=10V , I_D=10A,	---	120	160	mΩ
		V_{GS}=4.5V , I_D=6A,	---	125	170	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	2	3	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	----	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}＝±20V , V_{DS}=0V	-100	---	100	nA
gfs	Forward Transconductance	V_{DS}=10V ,I_D=10A	---	14.5	---	S
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=60V , V_{GS}=10V , I_D=10A	---	23	---	nC
Q_{gs}	Gate-Source Charge		---	3.5	---	
Q_{gd}	Gate-Drain Charge		---	5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=60V, R_{GEN}=3 Ω V_{GS}=10V, I_D=10A,	---	10.8	---	ns
T_r	Rise Time		---	5.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	32.6	---	
T_f	Fall Time		---	5.8	---	
trr	Body Diode Reverse Recovery Time	I_F=20A ,T_J=25°C dI/dt=100A/us	---	64	---	ns
Qrr	Body Diode Recerse Recovery Charge		---	152	---	nC
Dynamic Characterisitics						
C_{iss}	Input Capacitance	V_{DS}=60V , V_{GS}=0V , f=1MHz	---	1076	---	pF
C_{oss}	Output Capacitance		---	27	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	
Rg	Gate Resistance	f=1MHz	---	1.1	---	Ω

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current(Body Diode)	Tc==25°C	---	---	15	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, Is=10A	---	---	1.2	V

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.4mH, I_{AS}=10A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

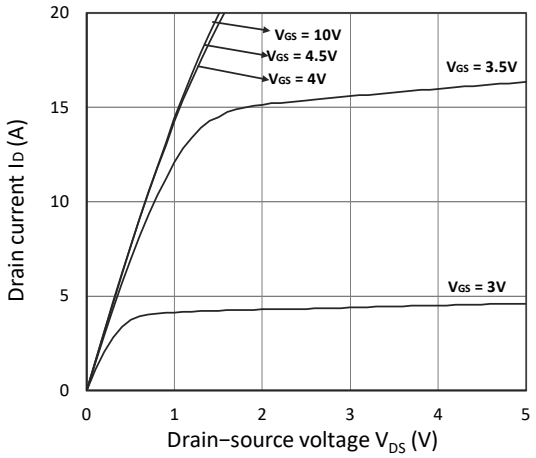


Figure 1. Output Characteristics

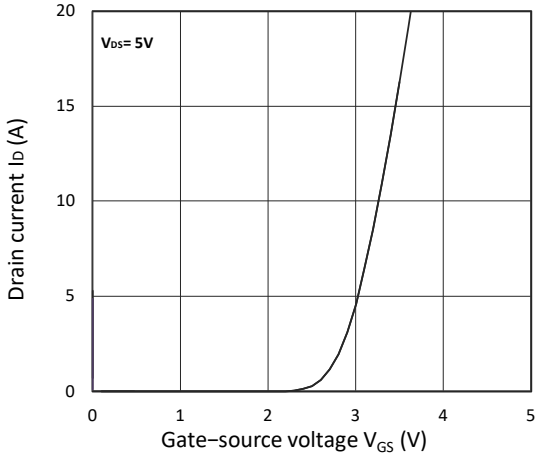


Figure 2. Transfer Characteristics

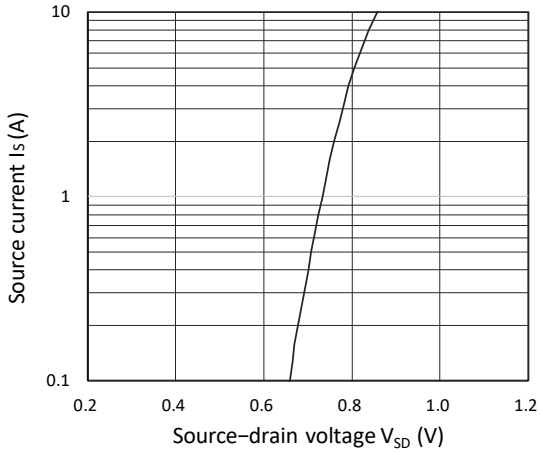


Figure 3. Forward Characteristics of Reverse

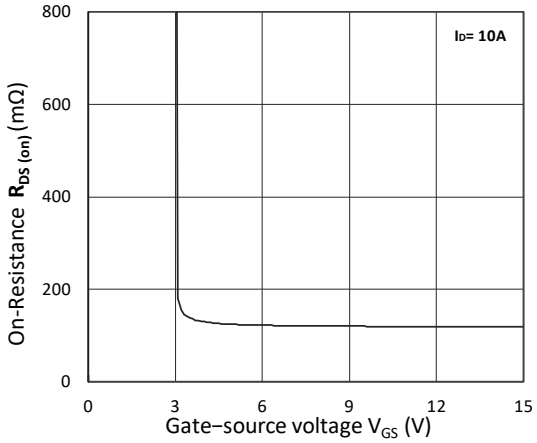


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

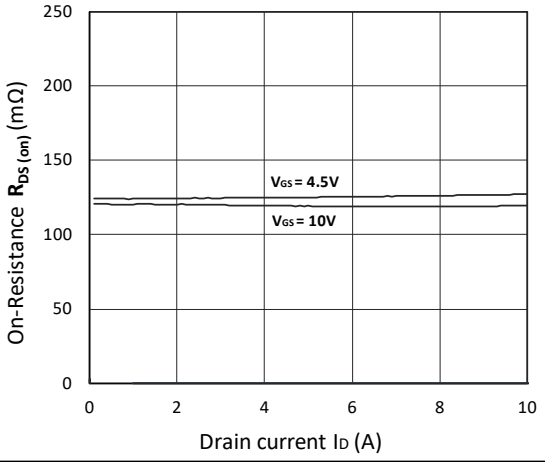


Figure 5. $R_{DS(ON)}$ vs. I_D

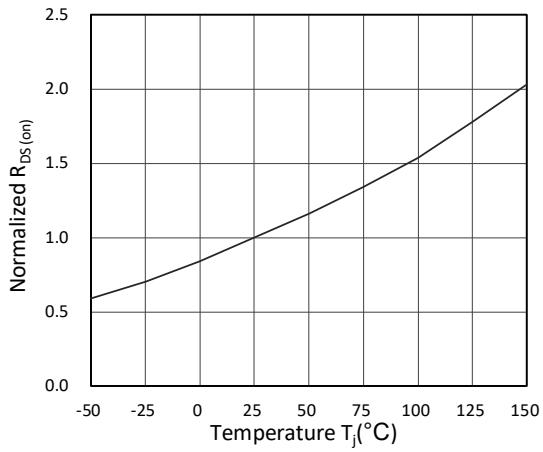


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

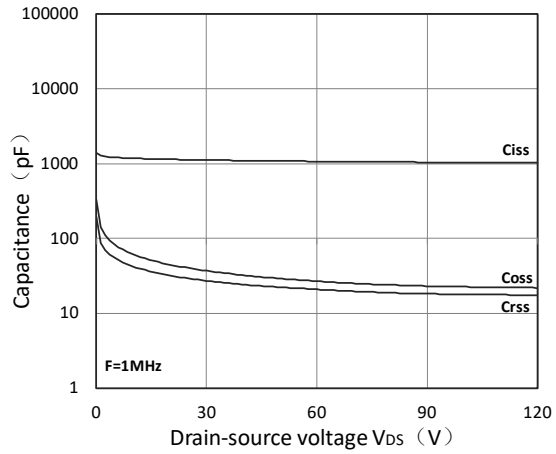


Figure 7. Capacitance Characteristics

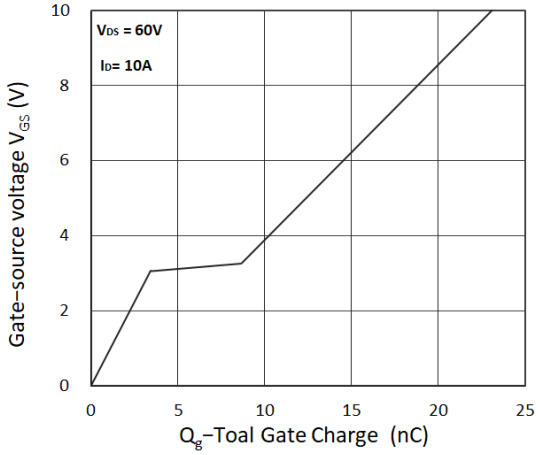


Figure 8. Gate Charge Characteristics

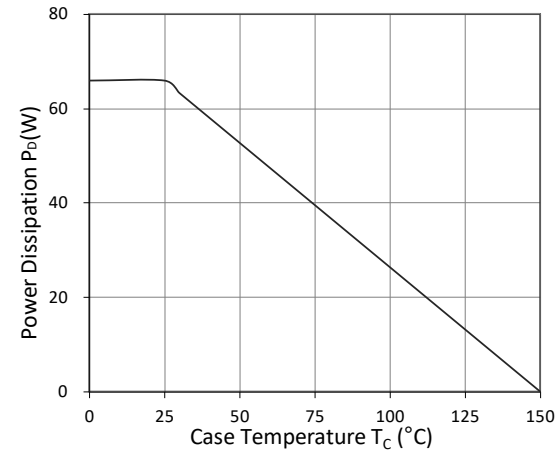


Figure 9. Power Dissipation

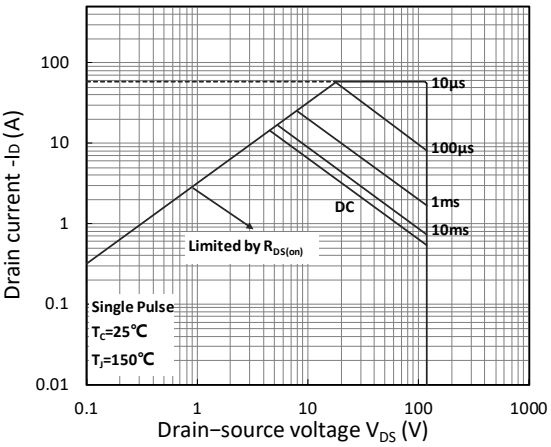


Figure10. Safe Operating Area

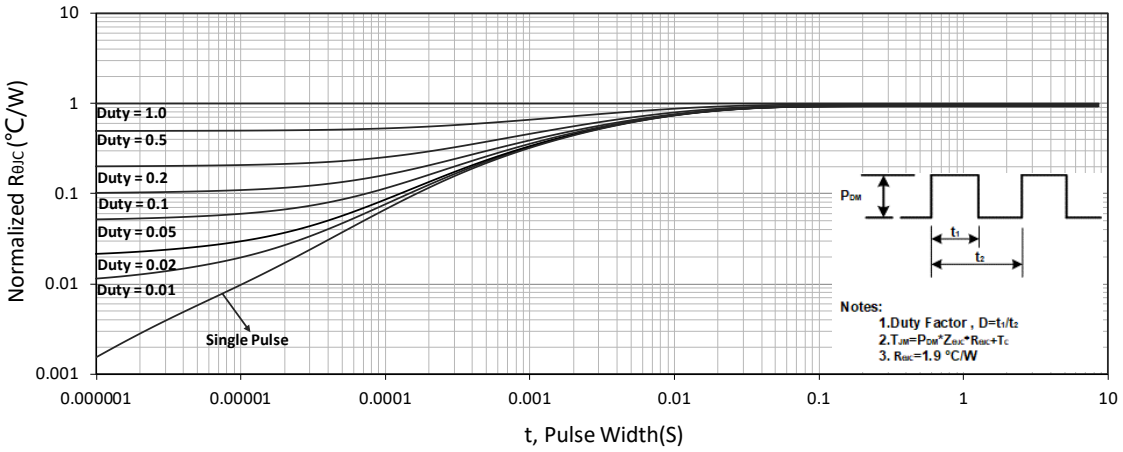


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

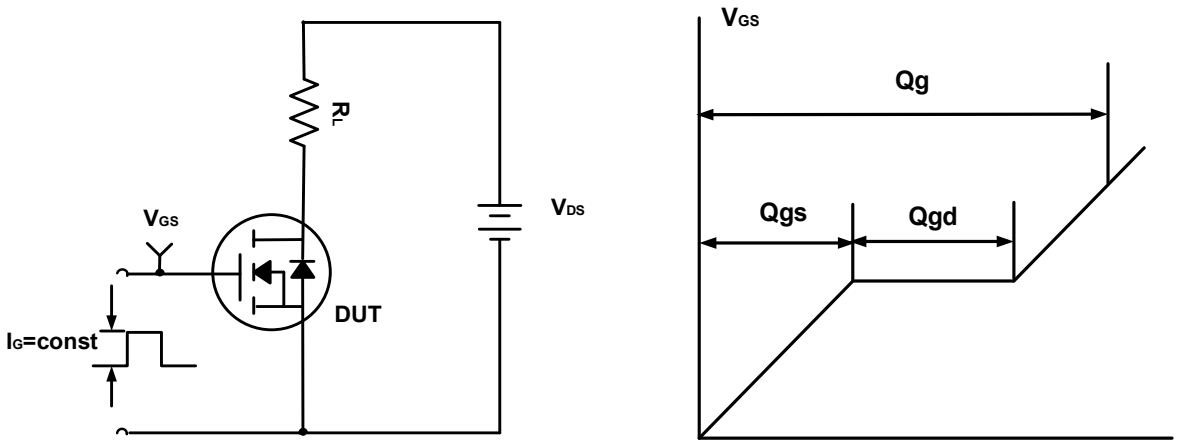


Figure A. Gate Charge Test Circuit & Waveforms

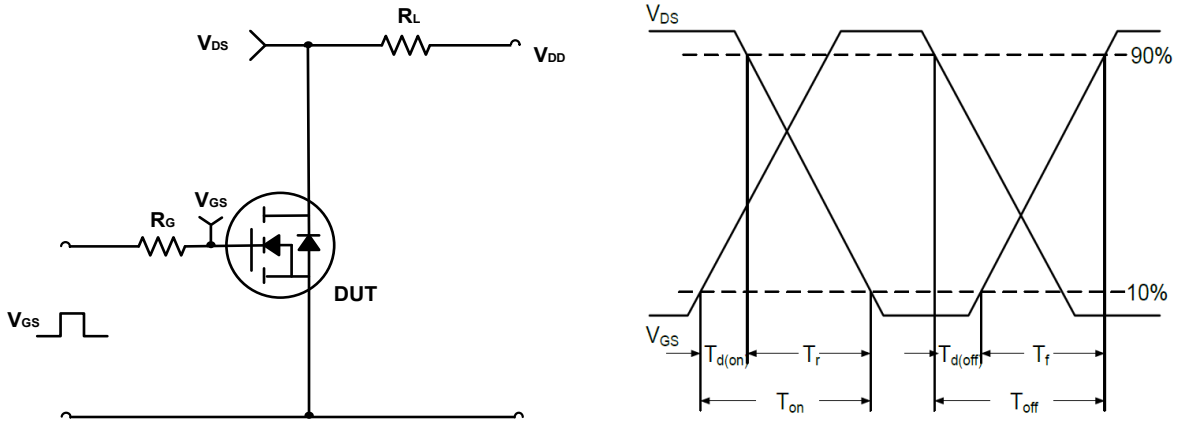


Figure B. Switching Test Circuit & Waveforms

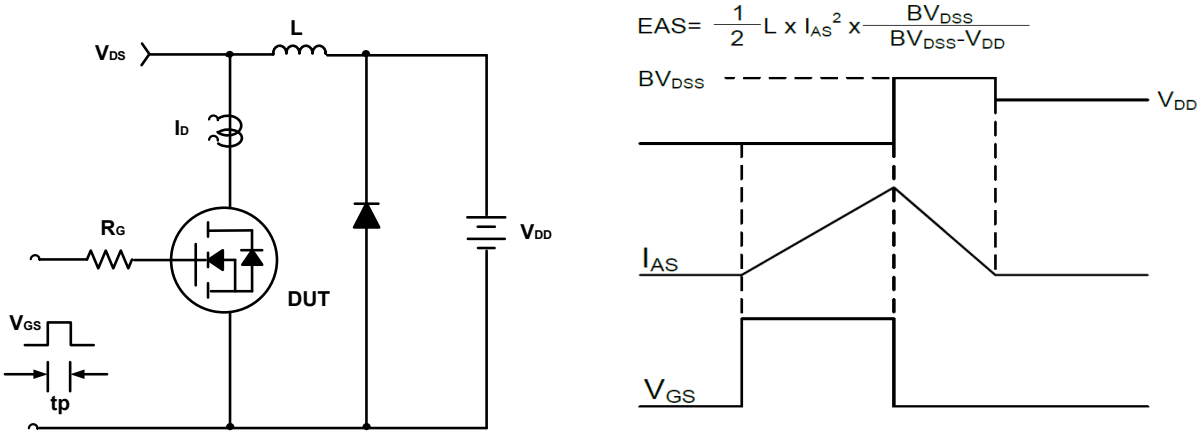
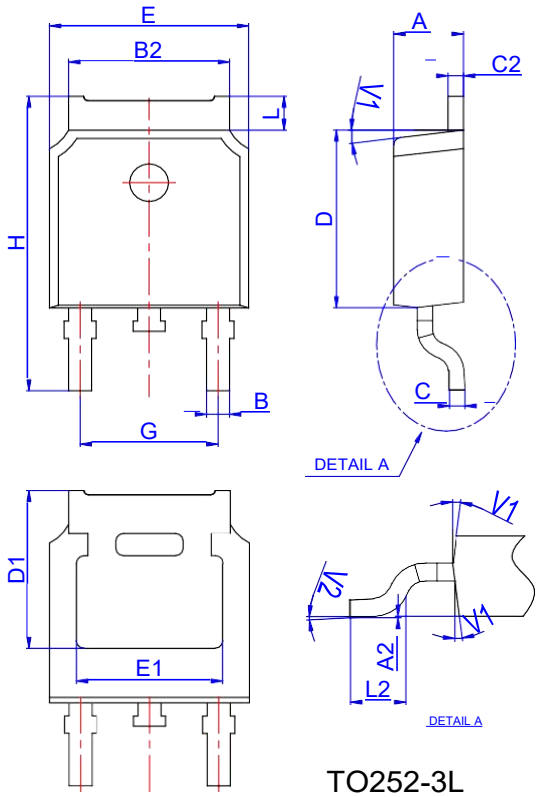


Figure C. Unclamped Inductive Switching Circuit & Waveforms

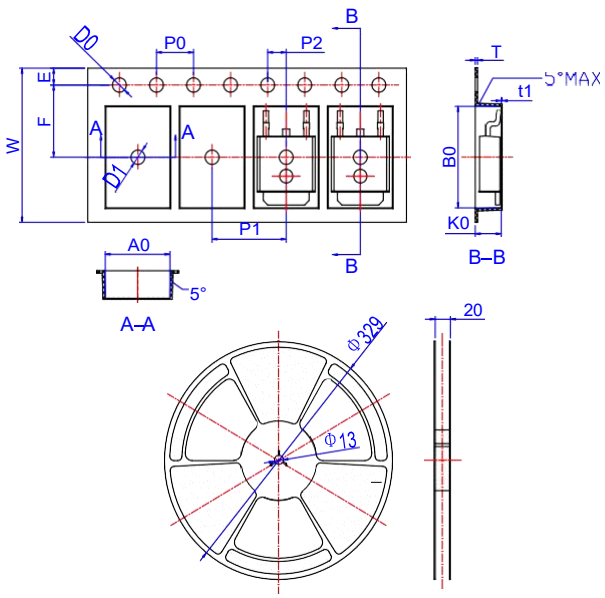
Package Mechanical Data TO252-3L



TO252-3L

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583